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CLAIMS

[Claim(s)]

[Claim 1] How characterized by comprising the following to call to a network dialup connection communication equipment by which dialup connection is made.

The 1st process which it is provided apart from the above-mentioned network, and communication equipment by the side of call origination reports that a connection request is to dialup connection communication equipment by a communication line which can call the above-mentioned dialup connection communication equipment.

The 2nd process in which dialup connection communication equipment which received a connection request makes dialup connection to the above-mentioned network.

The 3rd process with which communication equipment and dialup connection communication equipment by the side of call origination communicate via the above-mentioned network.

[Claim 2] How characterized by comprising the following to call the dialup connection communication equipment according to claim 1.

A code process which the 3rd process of the above enciphers at least some data which communication equipment of the transmitting side sends out at the 3rd process concerned among communication equipment by the side of the above-mentioned call origination, and dialup connection communication equipment, and is sent out.

A decoding process at which communication equipment of a receiver decodes enciphered data.

[Claim 3] How to call the dialup connection communication equipment according to claim 2, wherein the 1st process of the above includes a process which communication equipment or dialup connection communication equipment by the side of call origination notifies against an encryption key used in the case of encryption.

[Claim 4] How characterized by comprising the following to call the dialup connection communication equipment according to claim 1, 2, or 3.

A process which a server which relays communication between communication equipment by the side of call origination and dialup connection communication equipment is provided in the above-mentioned network, and both the above-mentioned communication equipment notifies that a library-name the 3rd process of the above indicates oneself to be is to the above-mentioned server, respectively.

A process as which both the above-mentioned communication equipment notifies a partner's library-name to the above-mentioned server, and chooses a partner's communication equipment.

A process of relaying communication between communication equipment in which the above-mentioned server was chosen.

[Claim 5] How characterized by comprising the following to call the dialup connection communication equipment according to claim 1, 2, or 3.

When the above-mentioned network transmits data, it specifies a transmission destination with an address in the network concerned, and. A process from which it is a network which assigns an extraordinary address for every connection, and, as for the 3rd process of the above, dialup connection communication equipment acquires its address in the present connection to dialup connection communication equipment.

A process which dialup connection communication equipment notifies with an E-mail that its address is to communication equipment by the side of call origination.

A process with which communication equipment and dialup connection communication equipment by the side of call origination specify a partner with a mutual address, and communicate.

[Claim 6] Communication equipment by the side of the above-mentioned call origination calls dialup connection

communication equipment directly in the above-mentioned communication line after the 3rd process of the above, How to call the dialup connection communication equipment according to claim 1, 2, 3, 4, or 5 including the 4th process of checking whether the dialup connection communication equipment concerned having cut a line connection with the communication line concerned normally.

[Claim 7] A child station which has a facility appliance.

· A key station which controls the above-mentioned facility appliance by communication with the child station concerned.

Are the above the supervision and control system which it had, and the above-mentioned key station, After calling the above-mentioned child station via a communication line which can be called and telling a connection request, Have a key station means of communication which communicates with the above-mentioned child station via the network formed apart from the above-mentioned communication line, and the above-mentioned child station, After receiving the above-mentioned connection request via the above-mentioned communication line, dialup connection was made at the above-mentioned network, and it has the child station means of communication concerned which communicates with the above-mentioned key station via a network.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] By dialup connection, this invention relates to how to call the dialup connection communication equipment connected to a network, and the supervision and control system using it, for example, when [, such as communication equipment linked to an Internet network,] required.

[0002]

[Description of the Prior Art] As one of the means of communication, the dial-up line network is used more widely than before. In this dial-up line network, in advance of communication, the network side secures a connection (logical communication path) between called parties the call origination side, and calls a called party. In the communications system of such a connection oriented type, establishment of a connection becomes difficult, so that a channel is long. Therefore, generally the tariff structure according to a communication range is used for a dial-up line network.

[0003] On the other hand, in recent years, an Internet network is spreading quickly as a new means of communication. When the communication equipment of the transmitting side transmits data in the case of an Internet network, a data row is divided for every predetermined size, datagram is created, and it sends out to neighboring communication equipment. The address (IP address) in the Internet network of the communication equipment of a receiver is added to each datagram. When datagram is received, based on the IP address of a transmission destination (receiver), communication equipment sends out data to the communication equipment of the direction near a receiver among neighboring communication equipment. Thereby, even if it does not establish a connection, the data of the transmitting side is sent to a receiver. In the communications system of such a connectionless type, no communication equipment of the transmitting side and a receiver grasps the communication path between both. Therefore, in the case of an Internet network, the fixed tariff structure is adopted in many cases for every predetermined periods, such as every tariff structure according to data volume (hour corresponding), or year. Since not both the tariff structure receives influence in the distance of the transmitting side and a receiver, their a possibility that communication cost will be reducible is high by communicating by long-distance communications, such as communication with overseas, especially using an Internet network.

[0004] Conventionally, the above-mentioned Internet network is used also for the real-time two-way communication between communication equipment, such as a video conference system and an Internet telephone, with improvement in the bandwidth of a circuit in recent years, although the E-mail etc. were used for a character subject's data communications.

[0005] By the way, the method of connecting each communication equipment to the above-mentioned Internet network can be divided roughly into two, connection by a dedicated line, and dialup connection. The connection method by a dedicated line is the method of preparing a communication wire for exclusive use between communication equipment and an Internet access provider (provider), and always connecting each communication equipment and an Internet network. In this case, since it is always connected to the Internet network, a peculiar IP address is assigned to communication equipment. This method is adopted at a big company, a university, etc.

The user has usually paid the telecommunications company etc. fixed expense as holding cost of a communication wire.

[0006] On the other hand, dialup connection is the method of connecting communication equipment and an Internet network to connect with an Internet network. Using a telephone line etc., it communicates with a provider, and connection with an Internet network is made, when a provider relays this communication. A provider assigns a vacant IP address as an IP address of the communication equipment concerned, when

communication equipment is connected. Thereby, an IP address can be shared among two or more communication equipment. In this method, a communication line for exclusive use is also unnecessary between each communication equipment. As a result, when there is little traffic, compared with a dedicated line circuit, it can use cheaply. Therefore, a dialup connection method is adopted in many cases, when there is comparatively little traffic, such as a small company, a home, etc. In this case, the provider is accumulating the E-mail. A user checks the predetermined storage area in a provider for every connection, and checks arrival of an E-mail.

[0007]

[Problem(s) to be Solved by the Invention]However, when the communication equipment of a called party has adopted the dialup connection method, the communication equipment by the side of call origination cannot judge a priori whether the called party is connected to the Internet network. If the communication equipment of the called party is connected to the Internet network at the time of call origination, the communication equipment by the side of call origination can communicate with a called party, but when that is not right, not both communication equipment can communicate. Therefore, it is not always connected certainly and has the problem that readiness is missing. When [, such as a case where it is going to talk over the telephone like the usual telephone, and a case of a video conference system,] it is going to carry out two-way communication of this problem in real time especially, it becomes fatal.

[0008]If this problem is the cases where each communication equipment connects with a network if needed, such as a case of not only an Internet network but personal computer communications, it will generate, but as shown below, in making dialup connection to an Internet network, the further problem occurs.

[0009]Specifically based on the IP address of each communication equipment which constitutes an Internet network, and the transmission destination included in datagram, the datagram concerned is transmitted. Therefore, in communicating, the transmitting side needs to grasp the IP address of a receiver. However, in a dialup connection method, it does not opt for the IP address of each communication equipment until it connects with each provider. Therefore, the transmitting side cannot grasp the IP address of a receiver beforehand like the leased-line-connection method.

[0010]Then, in order to solve this problem conventionally and to relay communication between each communication equipment, the server with a fixed IP address is installed. In this case, each communication equipment starts the above-mentioned server and communication, after connecting with an Internet network. If each communication equipment starts communication, a server will relay communication with one side to another side. In this case, since the datagram sent out to the IP address of the server is transmitted to a partner's communication equipment, each communication equipment does not need to know a partner's IP address. As a result, even if it is between the communication equipment which is making dialup connection, it can communicate convenient at all.

[0011]However, when a server is provided, it is necessary to maintain a server and the problem that holding cost starts newly occurs. When the server is crowded, the problem that it cannot communicate even if self-communication equipment and the partner's communication equipment are vacant is also derived. It is difficult not to establish the method of looking for a communications partner within a server, but to find a desired communications partner. For example, at present, a partner is looked for with the following searching methods in many cases. That is, each communication equipment registers its name to a server. A server displays the received list of names and each communication equipment chooses a desired partner from the inside of the list. In this method, the time and effort at the time of search increases as the number of jointers increases.

[0012]If the partner's communication equipment is not connected to the network even if it installs a server, the problem that communication cannot be started is not still solved.

[0013]this invention is made in view of the above-mentioned problem, and comes out. The purpose is to provide how to call the communication equipment which can improve for the readiness of the communication equipment concerned, when dialup connection of the communication equipment of ** is made at the network.

[0014]

[Means for Solving the Problem]How to call dialup connection communication equipment concerning an invention of claim 1 is how to call to a network dialup connection communication equipment by which dialup connection is made, and in order to solve an aforementioned problem, it is characterized by including each following process.

[0015]Namely, it is provided apart from the above-mentioned network, and by a communication line which can call the above-mentioned dialup connection communication equipment. The 1st process which communication equipment by the side of call origination reports that a connection request is to dialup connection communication equipment, The 2nd process in which dialup connection communication equipment which

received a connection request makes dialup connection to the above-mentioned network, and the 3rd process with which communication equipment and dialup connection communication equipment by the side of call origination communicate via the above-mentioned network are included.

[0016]As the above-mentioned network, networks of a connectionless type, such as an Internet network, personal computer communications, etc. are mentioned, and a telephone line, marine vessel radio, etc. are mentioned as the above-mentioned communication line, for example.

[0017]Generally, a network which cannot call a partner is easy to realize compared with communication lines etc. which can call a partner, such as a telephone line. Like dialup connection, when communication equipment connects with a network if needed, resources on networks, such as an address, can be shared with a channel of a network and communication equipment with other communication equipment and other uses, for example. Therefore, when carrying out the direct communication of the communication equipment by which dialup connection was made using the above-mentioned communication line, compared with a case where it is connected with a network in a dedicated line, reduction of communication cost is possible for it.

[0018]In the above-mentioned composition, before both communication equipment of communication equipment by the side of call origination and dialup connection communication equipment communicates via a network, communication equipment by the side of call origination tells a connection request to dialup connection communication equipment. Thereby, even if it is a case where dialup connection communication equipment is not connected to a network, it can be made to connect with a network at the time of communication in the 3rd process of the above. So, in dialup connection communication equipment which can communicate at a cheap fee, communication can be certainly started in desired timing and real time communication becomes possible.

[0019]How to call dialup connection communication equipment concerning an invention of claim 2, In composition of the invention according to claim 1, the 3rd process of the above, A code process to which communication equipment of the transmitting side enciphers and sends out at least some data sent out at the 3rd process concerned among communication equipment by the side of the above-mentioned call origination, and dialup connection communication equipment, Communication equipment of a receiver is characterized by including a decoding process of decoding enciphered data.

[0020]The method of using it, when enciphering can apply various methods, such as a method of using a common encryption key by encryption and decoding, and the method of enciphering using a public key and decoding using secret key with an another public key. Both communication equipment acquires encryption keys, such as a common encryption key and a partner's public key, in advance of the 3rd process by predetermined methods, such as communication at the 1st process of the above, or mailing.

[0021]When communicating via a network, data transmitted has a possibility that it may be intercepted or altered. Since communication equipment of an origination side and a receiver cannot specify a transmission line of data as a network in particular when using an Internet network etc., tapping of the danger of disturbance of communication, etc. are large.

[0022]However, in the above-mentioned composition, at least a part is concealed by encryption among communication contents from third parties other than communication equipment by the side of call origination, and dialup connection communication equipment. As a result, a communication content is not enciphered but safety to jamming can be improved compared with a case where it transmits with a plaintext.

[0023]As for data to encipher, a user name or an address of the communication content itself and both communication equipment, etc. is mentioned, for example. However, since a burden of both communication equipment increases as data volume to encipher increases, only some data may be enciphered in consideration of communicative importance. Generally, a third party's speculation of a user name, an address, etc. will be easy to guess the importance of a communication content. Therefore, when transmitting a user name, an address, etc. in advance of communication of a picture, a sound, etc., especially a thing for which these are enciphered is desired. Thereby, safety to jamming can be improved, without making a burden of both communication equipment increase not much.

[0024]How to call dialup connection communication equipment concerning an invention of claim 3, In composition of the invention according to claim 2, the 1st process of the above is characterized by including a process which communication equipment or dialup connection communication equipment by the side of call origination notifies against an encryption key used in the case of encryption.

[0025]When using a public key in the case of encryption, a partner is notified of a public key corresponding to his secret key. When enciphering using a common encryption key, a partner is notified of the encryption key concerned.

[0026]Since an encryption key is notified for every connection request, even if it is a case where a time of communicating last time and an encryption key are changed, in the above-mentioned composition, enciphered data can be sent [both communication equipment] and received convenient at all. In addition, it is carrying out

using a communication line by putting in block both sides of a notice of a connection request, and sending of an encryption key. Therefore, compared with a case where both are performed individually, time and effort which connects a communication line is reducible.

[0027]For example, by mail etc., when setting up an encryption key, each communication equipment needs to set up an encryption key before use. Since an encryption key is prepared for every communication equipment, if the number of communications partners increases especially, time and effort at the time of setting out will also increase. On the other hand, in composition of the invention according to claim 3, since an encryption key is notified for every connection and it is not necessary to set up each encryption key beforehand, time and effort at the time of setting out is reducible.

[0028]An encryption key is transmitted to a partner's communication equipment via a communication line, and data enciphered with the encryption key concerned is transmitted via a network. Therefore, when a third party tries disturbance of communication, it is necessary to monitor both communications. As a result, safety to jamming can be improved compared with a case where an encryption key and data are transmitted in a single means of communication.

[0029]How to, call dialup connection communication equipment concerning an invention of claim 4 on the other hand, In composition of the invention according to claim 1, 2, or 3, to the above-mentioned network. A server which relays communication between communication equipment by the side of call origination and dialup connection communication equipment is provided, and the 3rd process of the above, It is characterized by including a process which both the above-mentioned communication equipment notifies, respectively that a library-name which shows oneself is to the above-mentioned server, a process as which both the above-mentioned communication equipment notifies a partner's library-name to the above-mentioned server, and chooses a partner's communication equipment, and a process of relaying communication between communication equipment in which the above-mentioned server was chosen.

[0030]As the above-mentioned network, networks of a connectionless type, such as an Internet network, are mentioned, for example. In this composition, when enciphering by above-mentioned claim 2 or 3, a library-name of both communication equipment is mentioned as especially suitable data.

[0031]Even if it is a case where dialup connection communication equipment is not connected to a network, it can be made to connect with a network like claim 1 in the above-mentioned composition at the time of communication in the 3rd process of the above. Thereby, both communication equipment can start communication certainly in desired timing via a server provided in a network. Even if it is a case where a server exhibits a library-name, a user name of both communication equipment can be easily concealed from a third party by enciphering and registering a user name.

[0032]How to call dialup connection communication equipment concerning an invention of claim 5, In composition of the invention according to claim 1, 2, or 3, the above-mentioned network, For example, an Internet network etc. specify a transmission destination with an address in the network concerned, when transmitting data, and. To dialup connection communication equipment, are a network which assigns an extraordinary address for every connection, and the 3rd process of the above, Dialup connection communication equipment with a process of acquiring one's address in the present connection, and an E-mail. It is characterized by dialup connection communication equipment including a process of notifying one's address to communication equipment by the side of call origination, and a process with which communication equipment and dialup connection communication equipment by the side of call origination specify a partner with a mutual address, and communicate.

[0033]By the way, in the case of dialup connection communication equipment, an address is undecided until it connects with a network. Therefore, in a conventional method, communication equipment of an origination side cannot grasp an address of a receiver, and the communication equipment by which dialup connection was made cannot communicate via a network.

[0034]On the other hand, when providing a server which relays communication between both communication equipment in a network like composition of the invention according to claim 4, even if it is the communication equipment by which dialup connection was made, it can communicate convenient at all. However, expense, a sustaining cost, etc. which provide a server independently are needed in this case. When a server is [each other] crowded, there is a possibility that it may become impossible to communicate among both communication equipment.

[0035]On the other hand, in composition of the invention according to claim 5, the dialup connection communication equipment can notify the address concerned to communication equipment by the side of call origination, when its address is become final and conclusive, after connecting with a network. Thereby, both communication equipment can communicate via a network like composition of claim 4, without providing a server. Therefore, compared with composition of the invention according to claim 4, expense which communication takes is further reducible, and it is not concerned with confusion of a server but both communication equipment

can communicate certainly.

[0036]By the way, after communication through a network is completed, dialup connection communication equipment cuts connection with a network. Here, since the dialup connection communication equipment concerned will continue being connected to a network if dialup connection communication equipment fails in line disconnection with a network, communication cost soars undesirably. When dialup connection communication equipment is a child station of a supervision and control system and a user is not in the circumference of dialup connection communication equipment in particular, for example, it is hard to grasp that line disconnection went wrong. Therefore, when line disconnection goes wrong, a period when the dialup connection communication equipment concerned is undesirably connected to a network tends to become long, and a possibility that useless communication cost may increase is large.

[0037]On the other hand, how to call dialup connection communication equipment concerning an invention of claim 6, In composition of the invention according to claim 1, 2, 3, 4, or 5, further after the 3rd process of the above, It is characterized by including the 4th process of checking whether communication equipment by the side of the above-mentioned call origination having called dialup connection communication equipment directly in the above-mentioned communication line, and the dialup connection communication equipment concerned having cut a line connection with the communication line concerned normally.

[0038]In the above-mentioned composition, communication equipment by the side of call origination checks success or failure of line disconnection with a ring tone at the time of calling directly, etc., for example, after communication with dialup connection communication equipment is completed. Thereby, the communication equipment by the side of call origination can recognize certainly line disconnection failure of dialup connection communication equipment. Therefore, suitable treatment — for example, communication equipment by the side of call origination points to line disconnection again to dialup connection communication equipment, or a user of communication equipment by the side of call origination goes to a setting position of dialup connection communication equipment, and cuts a circuit — can be devised. As a result, generating of useless communication cost resulting from failure in line disconnection can be prevented certainly.

[0039]In the case of a communication line using a ring tone in which a period when a circuit is connected differed from a period when a circuit is cut, Dialup connection communication equipment is set up not carry out receipt until there is a ring tone of prescribed frequency, and at the time of a check, when communication equipment by the side of call origination identifies a ring tone by the prescribed frequency concerned, cutting of a circuit can be checked. In this case, if a circuit which communication equipment by the side of call origination used for a call directly by the above-mentioned prescribed frequency is cut, communication cost is unnecessary even if it is a case where dialup connection communication equipment is able to cut a circuit with a network normally.

[0040]By the way, if how to call dialup connection communication equipment concerning an invention of claim 1 is used, a communications system which a communicative start is possible to desired timing, and can reduce communication cost can be built.

[0041]Here, in a supervision and control system, generally a child station is installed in a place distant from a key station, and a key station carries out supervisor control of many child stations. Therefore, expense at the time of a key station and a child station communicating tends to increase, and reduction of communication cost is demanded strongly. When data which a child station sends out to a key station when supervising a setting position especially is picture image data and the data concerned is transmitted via a communication line which can be called since there is very much data volume, high communication cost is needed. On the other hand, in a supervision and control system, since delay in directions links with expansion of an accident directly, the child station must answer directions of a key station immediately. Therefore, when a child station communicates with a key station only via a network connected by dialup connection, a child station cannot conform to directions of a key station, but there is a possibility of making an accident expanding. Reducing communication cost is called for strongly, these results' maintaining the readiness of a child station to directions of a key station in a supervision and control system.

[0042]On the other hand, a supervision and control system concerning an invention of claim 7, In order to solve an aforementioned problem, in a supervision and control system which it had, a child station which has a facility appliance, and a key station which controls the above-mentioned facility appliance by communication with the child station concerned the above-mentioned key station, After calling the above-mentioned child station via a communication line which can be called and telling a connection request, Have a key station means of communication which communicates with the above-mentioned child station via the network formed apart from the above-mentioned communication line, and the above-mentioned child station, After receiving the above-mentioned connection request via the above-mentioned communication line, it is characterized by having made dialup connection at the above-mentioned network, and having the child station means of communication

concerned which communicates with the above-mentioned key station via a network.

[0043]In the above-mentioned composition, a key station means of communication of a key station calls a child station via communication lines, such as a telephone, at the arbitrary times at the time of there being a user's directions etc., for example. On the other hand, a child station means of communication of a child station establishes connection with networks, such as the Internet, by dialup connection, for example, after receiving a connection request from a key station. Then, a key station and a child station send and receive data via a network.

[0044]In the above-mentioned composition, since a child station is connected with a network by the dialup connection which can communicate at a cheap fee, compared with a case where a child station communicates with a key station only using a communication line, communication cost is substantially reducible. Since transmission and reception of data are performed via a network on the other hand after a key station calls a child station using a communication line which can be called, the key station can start communication with a child station in desired timing. While a child station can conform to directions of a key station in these results, a substantially reducible supervision and control system is [communication cost between a child station and a key station] realizable.

[0045]

[Embodiment of the Invention]

[A 1st embodiment] It is as follows when one embodiment of this invention is described based on drawing 1 thru/or drawing 4. How to call the dialup connection communication equipment concerning this embodiment, A called party can communicate via a telephone line and an Internet network the call origination side, And the communication equipment of a called party is the method of calling applied to the communications system by which dialup connection is made to the Internet network at least, for example, when communicating by Japan, the United States, etc. and long distances, it is an especially suitable method. Dialup connection is the method of communication equipment always not being connected with networks, such as an Internet network, but connecting with a network, when it judges that each communication equipment is required.

[0046]Below, before explaining the above-mentioned call method and the communication equipment which carries this out, the communications system with which the communication equipment concerned is used is explained. That is, as shown in drawing 1, the communications system 1 concerning this embodiment possessed the above-mentioned call method, and is provided with the communication equipment 2 and 3 used as the call origination side or a called party. According to this embodiment, it is not decided in particular any of each communication equipment 2 and 3 are on a call origination side or whether to become a called party, but both the communication equipment 2 and 3 has a function of both the call origination side and a called party so that it may mention later. The communication equipment 2 and 3 used as a called party is equivalent to dialup connection communication equipment given in a claim.

[0047]Both the above-mentioned communication equipment 2 and 3 is connected to the telephone line (communication line) 4, respectively. The above-mentioned telephone line 4, for example Digital channels, such as ISDN (Integrated Services Digital Network), Or it is an analog network etc. and each communication equipment 2 and 3 can notify the telephone number of the partner point to the switchboard of the telephone line 4 which turns a dial and is not illustrated, for example. Thereby, via the telephone line 4, mutually, a partner is called and each communication equipment 2 and 3 can carry out direct communication.

[0048]The user of each communication equipment 2 and 3 has joined Internet access provider (provider) 5 or 6, and Internet network (network) 7 can be used for the communication equipment 2 and 3 by dialup connection, respectively. Since each communication equipment 2 and 3 may become a case where it is on a call origination side, and a called party, the same function is required of both the providers 5 and 6. Below, although the provider 5 of the expedient top [of explanation] and communication equipment 2 side is explained, the provider's 6 composition is also the same.

[0049]The provider 5 makes ID which shows account (use qualification), and the password beforehand set up for every ID specifically enter, when a connection request is received from the communication equipment 2 via the telephone line 4. After collation with account and a password finishes, the provider 5 assigns an IP address vacant among the addresses (IP address) on Internet network 7 which oneself holds as an extraordinary IP address of the communication equipment 2 concerned. Thereby, the communication equipment 2 can recognize its IP address at the time of the present connection. As a result, the communication equipment 2 creates the data row (datagram) divided for every predetermined size, can be sent out to the provider 5 or can identify the datagram addressed to itself among the datagram received from the provider 5. The provider 5 transmits the datagram from the communication equipment 2 to Internet network 7, and sends out the datagram from Internet network 7 to the communication equipment 2. Thereby, even if the communication equipment 2 does not have a peculiar IP address, it is connectable with Internet network 7.

[0050]The provider 5 is sharing the IP address, the connecting circuit with Internet network 7, etc. among the members by dialup connection. Therefore, in the provider 5, the connection fees of dialup connection are set up at a low price compared with the case of a leased circuit connection in many cases, when the communication equipment 2 holds a peculiar IP address and has always connected with Internet network 7 via a communication line for exclusive use.

[0051]The provider 5 has the access point, in order to communicate with the communication equipment 2 via the telephone line 4. The access point is allotted to the neighborhood of the communication equipment 2, such as within the limits which can talk over the telephone by a local office number, for example, and when the communication equipment 2 communicates with the provider 5, it can stop the usage fee (phonecall charges) of the telephone line 4 at a low price.

[0052]The provider 5 is also a mail server of the communication equipment 2. The provider 5 has assigned the e-mail address beforehand to the communication equipment 2, and, specifically, has the storage area (mail box) corresponding to this which is not illustrated. The E-mail addressed to communication equipment 2 is delivered to the provider 5, and the provider 5 receives the E-mail addressed to communication equipment 2, and accumulates it in a corresponding mail box. It is always connected to Internet network 7, and the IP address of the provider 5 is always constant. Therefore, it is not concerned with the IP address at whether the communication equipment 2 is connected to Internet network 7, and the time of connection, but an E-mail is delivered certainly. When each communication equipment 2 makes dialup connection, it can read the E-mail addressed to itself from the above-mentioned mail box.

[0053]Now, an Internet network is spreading widely and many providers have started service. Many of these providers are supporting dialup connection, and they have the function of a mail server. Therefore, the communications system 1 concerning this embodiment can be easily constituted by forming the communication equipment 2 and 3.

[0054]Then, it explains as an example of composition of each communication equipment 2 and 3 focusing on the case where the both sides of a sound and a picture are transmitted like video conferencing for example. Below, not only when transmitting the both sides of a sound and a picture, but both the communication equipment 2 and 3 names it a network meeting to transmit data to real time generically via networks, such as Internet network 7.

[0055]Although it can consider that various composition mentions later as a realization method of each communication equipment 2 and 3, Here, the communication equipment 2 (3) explains composition provided with the connector 2a (3a) which controls connection with the telephone line 4 and Internet network 7, and computer 2b (3b) used as an input/output device. In this composition, the connector 2a is enforcing the method of calling concerning this embodiment. The telephones 2c and 3c are formed in each communication equipment 2 and 3, respectively for usual telephone calls other than communication by the above-mentioned call method. Since both the communication equipment 2 and 3 has the same composition, below, it is explained to details only about the composition of the expedient top of explanation, and the communication equipment 2.

[0056]That is, computer 2b is provided with input devices which are not illustrated, such as a video camera and a microphone, for example, and can transmit users' sound, a picture, etc. to the connector 2a as a digital data row. Computer 2b is provided with output units (not shown), such as a monitor and a speaker, via the connector 2a, carries out [sound / a picture or] the data row received from the communication equipment 3, and can notify a user of it.

[0057]Between computer 2b and the connector 2a, for example, RS232C, RS422A and IrDA, or LAN is connected by the preselected correspondence procedure, and data can be sent and received bidirectionally. If two-way communication is possible for the correspondence procedure between both in real time, it will ask it about neither a cable / radio or digital one/analog, transmission speed nor a telecommunications standard.

[0058]On the other hand, the connector 2a concerning this embodiment is provided with the following.

The Flash memory 11 which memorizes the program which enforces the method of calling concerning this embodiment as shown in drawing 2, various setting out, etc.

The interface part 12 which communicates with computer 2b with the above-mentioned predetermined correspondence procedure.

IC(Integrated Circuit) 13 for communication connected with the telephone line 4 and the telephone 2c.

RAM(Random Access Memory) 15 used as CPU(Central Processing Unit) 14 which controls the whole connector 2a, and the storage area of operating.

For example, in order to display the state of the connectors 2a, such as an e-mail address of the communication equipment 3, the status display liquid crystal panel 16 is formed. Each members 11 thru/or 16 are connected to the bus 17, respectively, and the data between each member is transmitted via the bus 17.

[0059]The above-mentioned Flash memory 11 is a rewritable nonvolatile memory electrically, and the program which performs operation mentioned later, and the various preset values used by the program concerned are

stored. Specifically as a preset value about the communication equipment 3, the telephone number at the time of calling directly, etc. are mentioned. When calling directly, the password for the communication equipment 3 to identify the communication equipment 2 is also stored. The password concerned is beforehand transmitted also to the communication equipment 3, and the communication equipment 3 can judge whether it is the call from a regular user by comparing this password. The provider's 5 telephone number, account, the password, and their e-mail address are stored as a preset value about the provider 5. In this embodiment, when communicating via Internet network 7, for example using public-key crypto systems, such as RSA numerals, the communication equipment 2 and the communication equipment 3 encipher at least one copy of a communication content, and communicate. Therefore, the Flash memory 11 has also memorized the secret key and public key which are used in the case of encryption and decryption. Though natural, it may replace with the Flash memory 11 and ROM (Read-Only Memory), RAM by which the battery back-up was carried out, or a hard disk may use the recording device which has fixity.

[0060]The interface parts 12 are interfaces according to the correspondence procedure of computer 2b and the connector 2a, such as a RS232C interface, for example, and CPU14 can communicate with computer 2b via the interface part 12 concerned.

[0061]The above-mentioned IC13 for communication is IC for modems, etc., can control the line connection/cutting of the telephone line 4, or can change mutually the data row which CPU14 processes, and the electrical signal transmitted in the telephone line 4, for example. According to directions of CPU14, the telephone line 4 and the telephone 2c can be connected, and the bell of the telephone 2c can also be sounded.

[0062]On the other hand, CPU14 controls the interface part 12 and IC13 for communication according to the program of the Flash memory 11. The connector 2a dials a desired telephone number, and direct communication can be carried out to the communication equipment 3 via the telephone line 4, or, specifically, it can connect it to Internet network 7 via the provider 5. Thereby, the connector 2a can perform the direct communication through the telephone line 4, and communication through Internet network 7 in predetermined order so that it may mention later.

[0063]CPU14 can control computer 2b and the telephone 2c via the interface part 12 or IC13 for communication. Thereby, the connector 2a can judge whether the connection to which Internet network 7 was passed from the user by keystroke etc., for example was directed to computer 2b, a connection destination, etc. The connector 2a can connect the telephone line 4 and the telephone 2c, and can usually talk over the telephone.

[0064]When direct continuation is carried out via the telephone line 4, a predetermined message is sent out to the communication equipment 3 via IC13 for communication, and CPU14 can identify the message which received from the communication equipment 3. The correspondence procedure between the communication equipment 2-3 is the serial communication according to standards, such as V32, V32bis, V34, V21, or V22, and a message can be sent and received among both, for example.

[0065]When dialup connection of the communication equipment 2 and the provider 5 is made, CPU14 sends [on the other hand,] and receives the provider 5 and datagram via IC13 for communication. Thereby, the connector 2a recognizes the IP address at the time of the present connection, and it can send out the E-mail of a predetermined form. The connector 2a judges whether its mail box prepared for the provider 5 was checked with the predetermined cycle, and the E-mail from the communication equipment 3 has arrived. When the E-mail has arrived, the contents of the E-mail are checked and a partner's IP address can be recognized.

[0066]In addition, when having connected via Internet network 7, CPU14 controls the interface part 12 and IC13 for communication, and relays communication between computer 2b and Internet network 7. When data is transmitted in a different form from the datagram transmitted between computer 2b and the connector 2a with Internet networks 7, such as a voice data column and the image data sequence itself, CPU14 carries out the interconversion of both. On the other hand, when datagram is transmitted between computer 2bs, CPU14 passes the datagram concerned as it is. Thereby, the connector 2a can relay communication convenient at all between computer 2b and Internet network 7.

[0067]CPU14 can encipher the data sent out to the communication equipment 3 using the public key of the communication equipment 3, or can decode the data received from the communication equipment 3 using its secret key memorized beforehand.

[0068]In the above-mentioned explanation, in the communication equipment 2, although computer 2b is taking charge of input and output, an input/output device is not restricted to this. As mentioned above, the transmission method of the data between input/output devices, such as computer 2b, and the connector 2a asks neither radio/cable, an analog to digital or transmission speed nor a telecommunications standard. Therefore, various input devices, such as telephone and a video camera, can be used. However, the connector 2a needs to change mutually the datagram transmitted with Internet network 7, and the data between the telephone 2c and

the connector 2a in this case.

[0069]As especially shown in drawing 3, when using the telephone 22c, the telephone 22c can be used as an input device of the communication equipment 22 on the both sides of the telephone call through Internet network 7, and the usual telephone call. Between the telephone 22c of the same composition as usual, and the telephone line 4, since what is necessary is just to connect the connector 22a, compared with the case where other input devices are formed, installation becomes easy.

[0070]In this case, since the input device is only the telephone 22c, it is necessary to distinguish the telephone call through Internet network 7, and the usual telephone call. Although this may form a switch etc. in the connector 22a and it may point to the telephone call through Internet network 7, the user can distinguish both by, for example, using the method shown below only using the telephone 22c. That is, in the usual telephone call, such as pushing the “**” button 3 times, after taking a receiver, a user pushes the button of a partner's registration number set up beforehand, after doing operation which is not used. With the audio signal sent from the telephone 22c, the connector 22a recognizes these button grabbing, and identifies generating of a connection request, and the partner point. And if a partner and a telephone call are attained via Internet network 7, the bell of the telephone 22c will be sounded and a user will be notified, for example. On the other hand, if the usual telephone number is pushed, with the signal from the telephone 22c, the connector 22a will be judged to be the usual telephone call, and will pass the signal concerned as it is to the telephone line 4. Thereby, the telephone 22c talks over the telephone directly via the telephone line 4 like the case where there is no connector 22a. Thus, it is distinguishable from the connection request which passed Internet network 7 with the input device as operation of directing communication through Internet network 7, by assigning the operation which does not carry out normal use only using the same input device as usual, and the usual communication connection request.

[0071]In the above-mentioned explanation, in the communication equipment 2, although the connector 2a is taking charge of control of the turn which computer 2b takes charge of input and output, for example, is connected with the telephone line 4 or Internet network 7, encryption, etc., the division of roles of both member 2a and 2b is not restricted to this, either. For example, computer 2b may perform most processings of the connectors 2a, such as turn control, encryption, etc. of the above-mentioned connection. In this case, the connector 2a can divert the usual modem, the terminal adopter of ISDN, etc.

[0072]In drawing 1 and drawing 3, although the expedient top, the connector 2a (22a), computer 2b, and the telephone 2c (22c) of explanation are indicated as a respectively different member, though natural, it may unify. The telephone etc. which formed in one the TV for home with which the connector 2a shown in drawing 1 and computer 2b were united as an example of unification or the connector 22a shown in drawing 3, and the telephone 22c are mentioned. As the telephone line 4, if the telephone line of radio is used, the above-mentioned integral-type telephone can also be constituted as a cellular phone. If a video camera is adopted as an input/output device and it unites with the connector 2a, the video camera which can send out a picture, a sound, etc. is realizable via Internet network 7. In this case, since it is portable if a radio telephone network is used, it is still more suitable. If a /different body or an input/output device, and also the telephone line 4 really combine radio, a cable, etc., the communication equipment 2 can consider various composition.

[0073]Next, in the communications system 1 shown in drawing 1, when operation in case the communication equipment 2 calls the communication equipment 3 is explained for every step based on the flow chart shown in drawing 4, it is as follows.

[0074]That is, if the user of the communication equipment 2 directs communication with the communication equipment 3 to the communication equipment 2 by the keystroke of computer 2b, etc., for example, in Step S1a, the communication equipment 2 will dial the telephone number of the communication equipment 3. Thereby, the communication equipment 3 is called via the telephone line 4. Below, Step S1a is only called for short like S1a. a is shown in an end like S1a, for processing which the communication equipment 3 performs, b is added to an end like S1b, and both are distinguished at processing which the communication equipment 2 performs.

[0075]On the other hand, when it may communicate, the user of the communication equipment 3 pushes a button beforehand, and is pointing to one of receiving weight to the communication equipment 3, for example (S1b). The communication equipment 3 answers the call of a telephone, when receiving weight is one (S2b). As a result, the communication equipment 2 and the communication equipment 3 can start direct communication via the telephone line 4.

[0076]The communication equipment 2 will send out predetermined messages, such as “a public key of the e-mail address communication equipment 2 of the user of the user name PASSWORD:password communication equipment 2 of the CALL CU-SEEME from communication equipment 2”, for example, if the response of the communication equipment 3 is detected, The public key of the user name of the communication equipment 2, a password, an e-mail address, and the communication equipment 2 used at the time of communication is notified

to the communication equipment 3 (S2a). The communication equipment 3 compares the combination of the user name and password which were received with the combination memorized beforehand, and judges whether it is a regular communications partner (S3b). When the user name and the password are mistaken, or when the partner is talking over the telephone with the sound and it is not a regular communications partner, the connector 3a of the communication equipment 3 sounds the bell of the telephone 3c, and connects the telephone line 4 and the telephone 3c (S4b). Thereby, the user of the communication equipment 3 can talk with a partner using the telephone 3c. In this case, subsequent processings are not performed.

[0077]When it can check that it is a regular communications partner, on the other hand in the above S3b, the communication equipment 3, For example, "the public key of the e-mail address communication equipment 3 of the user of the user name communication equipment 3 of the OK CU-SEEME from communication equipment 3", etc. send out a predetermined message (S5b), and the communication equipment 2 receives the message concerned (S3a). Thereby, the communication equipment 2 can acquire the public key of that the communication equipment 3 received its connection request, the user name of the communication equipment 3, an e-mail address, and the communication equipment 3 used at the time of communication.

[0078]Then, the communication equipment 2 and 3 cuts connection with the telephone line 4, respectively (S4a-S 6b), and starts dialup connection to the predetermined provider 5 or 6 (S5 a-S 7b). In each communication equipment 2 and 3, the network meeting software currently beforehand prepared for computer 2bs, such as CU-SEEME which pointed to the connectors 2a and 3a to computer 2b, for example, the Corel university developed, is started (S6 a-S 8b).

[0079]In the above S5a and S7b, if it succeeds in dialup connection, each communication equipment 2 and 3 will acquire the IP address only for present connection from each provider 5 and 6 (S7aandS9b). As a result, each communication equipment 2 and 3 can send out datagram now to Internet network 7.

[0080]However, at present, the communication equipment 2 and the communication equipment 3 do not grasp a partner's IP address, and cannot generate datagram addressed to a partner. Therefore, each communication equipment 2 and 3 cannot start communication between both the communication equipment 2-3, although the providers 5 and 6 etc. can communicate with the apparatus which has a predetermined IP address.

[0081]Then, each communication equipment 2 and 3 enciphers its name and its IP address using the public key sent by the partner in the above S2a or S5b. Then, each communication equipment 2 and 3 is sent out to the e-mail address of the partner point by making the cryptogram concerned into an E-mail (S8 a-S 10b). It is enciphered by the public key of the partner point, and each E-mail cannot be decoded unless it uses the secret key which the partner holds.

[0082]A 5-second interval etc. are predetermined cycles and each communication equipment 2 and 3 is supervising its mail box prepared for the providers 5 and 6, for example. If the E-mail from a partner arrives, each communication equipment 2 and 3 will read the E-mail concerned from the above-mentioned mail box, and will decode a code using its secret key. Thereby, each communication equipment 2 and 3 can acquire a partner's name and IP address (S9a-S 11b).

[0083]If a partner's IP address is acquired, each communication equipment 2 and 3 will notify the IP address concerned to network meeting software, and will call a partner. Thereby, communication is started with network meeting software (S10 a-S 12b).

[0084]By the way, the IP address of the transmitting side other than the IP address of a transmission destination is included in each datagram. Thereby, when one communication equipment 2 (3) calls a partner's communication equipment 3 (2), the above-mentioned network meeting software of a called party can recognize the IP address by the side of call origination based on the datagram which received. Therefore, communication can be started when one side calls. When processing of the above S10a is started earlier than processing of S12b, specifically, the communication equipment 3 does not need to perform the above S11b. Similarly, when the above S12b is earlier, the communication equipment 2 can omit processing of the above-mentioned S9a. Since the above-mentioned network meeting software is created so that it can communicate, even when both sides call simultaneously, even if it is a case where each above-mentioned processing S9a-S 11b is not omitted, it can start communication convenient at all.

[0085]Even if either does not send an E-mail when both communication equipment 2 and 3 is making dialup connection since communication can be started when one communication equipment 2 (3) calls a partner's communication equipment 3 (2), both the communication equipment 2 and 3 can start communication. However, since communication can be started when one of E-mails arrives when both the communication equipment 2 and 3 sends an E-mail, compared with the case where only one side sends an E-mail, the probability which can start a communication start early more becomes high.

[0086]During the meeting, the sound and picture from computer 2b are sent to the computer 3b via the connector 2a, the provider 5, Internet network 7, the provider 6, and the connector 3a, and, as for the sound and

picture from the computer 3b, the above-mentioned course is sent to the opposite direction. Thereby, the user of the communication equipment 2 and the communication equipment 3 can communicate with network meeting software (S10 a-S 12b). After a meeting is completed, each communication equipment 2 and 3 cuts dialup connection, respectively (S11 a-S 13b), and communication between the communication equipment 2-3 ends it. [0087]For example, a predetermined button is pushed and it is pointing [the case where the user of a receiver is absent, and] to OFF of communication weight to the connector 3a to receive communication through Internet network 7. In this case, the connector 3a does not perform processing after the above S2, but connects it to the telephone 3c unconditionally.

[0088]By the way, the datagram which each communication equipment 2 and 3 sent out when communicating via Internet network 7, At the sending-out time, it addresses through what kind of course, and reaches previously, or is unknown, and when the apparatus which constitutes Internet network 7 receives datagram, it determines the apparatus which datagram passes next.

[0089]Therefore, in the apparatus which each datagram passed, change, a copy, etc. of datagram are easy and it is easy to block communication compared with the case where direct communication is carried out via the telephone line 4. Since it is easy to judge communicative importance from a user name especially when a user name and an IP address are sent out by E-mail with a plaintext, a possibility that future communications will be blocked preponderantly becomes high. On the other hand, since data processing is indispensable to cipher processing or decoding processing, as compared with the case where it does not encipher, high throughput is required of each communication equipment 2 and 3.

[0090]Therefore, in this embodiment, since it is compatible in the burden at the time of communication, and the safety to disturbance, only the contents of the E-mail have been enciphered. However, when still higher safety is required from disturbance, the communication period of network communication software can also improve safety comparatively easily by enciphering a communication content.

[0091]Since the course which each datagram passes was not decided, the guarantee of the arrival time of datagram is difficult. In a certain channel, when data volume crosses tolerance level, there is a possibility that datagram may be lost. However, in the communications system 1 concerning this embodiment, in order to transmit voice data and image data, each communication equipment 2 and 3 is connected with Internet network 7 via the communication line which has sufficient channel capacity. When choosing both the providers 5 and 6, a provider by whom between both the providers 5-6 is being connected by the circuit which has sufficient channel capacity is chosen. Therefore, like an E-mail, when there is very little data volume compared with voice data or image data, the danger of delay or a loss has a practically sufficiently low value. If an E-mail is resent when an E-mail does not arrive within predetermined time, the possibility of delay or a loss can be reduced further.

[0092]In this embodiment, although both the communication equipment 2 and 3 is exchanging the mutual e-mail address by the telephone line 4 in advance of communication with Internet network 7, it is not restricted to this. For example, a partner's e-mail address may be beforehand memorized in the Flash memory 11 etc. which are shown in drawing 2. However, an e-mail address may be changed for the sake of a user's convenience. In this case, the user of each communication equipment 2 and 3 notifies an e-mail address new as a partner whenever it changes an e-mail address, and the time and effort which resets the received e-mail address to each communication equipment 2 and 3 produces the user of a partner's communication equipment 2 and 3. On the other hand, in this embodiment, since the mutual e-mail address is notified for every call origination, the time and effort at the time of e-mail address change is substantially reducible.

[0093][A 2nd embodiment] As means of communication with the another telephone line 4, a 1st embodiment of the above uses Internet network 7, and the communication equipment 2 and the communication equipment 3 carry out direct communication with Internet network 7. On the other hand, as shown in drawing 5, the telephone line 34 of the communications system 31 concerning this embodiment is the same as that of a 1st embodiment as another communication line at the point which uses Internet network 37. However, it differs in that the communication equipment 32 and the communication equipment 33 communicate via the server 38 provided on Internet network 37. In the communications system 31, each member of the communication equipment 32 thru/or Internet network 37 has a function of the approximately said appearance as the communication equipment 2 thru/or Internet network 7 shown in drawing 1. Therefore, only a different portion is explained and explanation of the same portion is omitted.

[0094]The server 38 provided in the communications system 31 concerning this embodiment is called the reflector etc., has a peculiar IP address, and can relay communication between the communication equipment 32.33 which is communicating with the server 38. Specifically, the field which stores the combination of the IP address of apparatus and library-name which are communicating now is established in the server 38. If each apparatus notifies a library-name to the server 38, the server 38 stores the combination of the IP address of the apparatus concerned, and a library-name in a described area. The server 38 can send out the list of library-

names from a described area according to the demand of each apparatus. Thereby, each apparatus can know the library-name of the apparatus which can be communicated now via the server 38. Apparatus specifies a library-name to the server 38, and can choose a desired communications partner.

[0095]When the server 38 stores the library-name of apparatus, it has memorized the IP address and library-name of a complete aircraft machine. Therefore, the server 38 can send out the datagram received from one side to the IP address of another side, when apparatus specifies a communications partner. The server 38 can transmit the datagram received from a certain apparatus to two or more apparatus. In this case, communication between two or more apparatus is attained.

[0096]Now, the various servers 38 are formed on Internet network 37, and in it, the server 38 which exhibits the IP address also exists so that it can be used by many and unspecified apparatus. Therefore, the above-mentioned communications system 31 can be easily constituted by choosing these servers 38.

[0097]According to this embodiment, the hardware constitutions of each communication equipment 32 and 33 are the same as that of the communication equipment 2 and 3 shown in drawing 1, and operation changes with differences of the software carried. Therefore, henceforth, the operation at the time of the communication equipment 32 calling the communication equipment 33 is explained, and explanation is omitted about hardware constitutions.

[0098]As shown in the flow chart of drawing 6, the method of calling concerning this embodiment is provided with the step (S21a thru/or S31a and S21b thru/or S33b) which performs the same processing as Step S1a shown in drawing 4 thru/or S11a and S1b thru/or S13b.

[0099]However, to having used the E-mail and having exchanged the mutual IP address, when each communication equipment 32 and 33 specified a communications partner in a 1st embodiment in this embodiment. Each communication equipment 32 and 33 registers a predetermined library-name to the server 38, chooses a partner's library-name, and specifies the communications partner. Therefore, its IP address is replaced with the step exchanged mutually like S8a and S9a shown in drawing 4, and S10 b-S 11b, and each step shown below, S28 a-S 29a, and S30 b-S 31b are formed. In S22a and S25b, each communication equipment 32 and 33 is omitting the notice of an e-mail address.

[0100]That is, when processing of S27a and S29b is ended, each communication equipment 32 and 33 can send out datagram including one's IP address to Internet network 37 via each provider 35 and 36. At this time, the public key and user name which the partner sent out by S22a or S25b are acquired.

[0101]Each communication equipment 32 and 33 enciphers each user name by the above-mentioned public key. Each communication equipment 32 and 33 is notified to the server 38 by making the enciphered user name into a library-name. The server 38 registers the combination of the library-name of each communication equipment 32 and 33, and an IP address (S28 a-S 30b). The server 38 can acquire each IP address based on the datagram etc. which each communication equipment 32 and 33 sent out at the time of the notice of a library-name.

[0102]According to this embodiment, it is enciphered and the library-name of each communication equipment 32 and 33 is registered into the server 38. Therefore, the third party who is communicating with the server 38 can see the list of library-names, however cannot know a user name. As a result, also in this embodiment, a user name can be concealed from a third party like the case where an E-mail is enciphered, in a 1st embodiment.

[0103]Next, each communication equipment 32 and 33 requires the list of library-names of the server 38. Each communication equipment 32 and 33 decodes each library-name under list using its own secret key, and chooses the library-name the user name notified beforehand and whose decoding result correspond. Then, each communication equipment 32 and 33 notifies the library-name concerned to the server 38 as a communications partner (S29 a-S 31b). The server 38 acquires one IP address from the datagram etc. which are used in the case of a notice, and acquires the IP address of another side from the IP address corresponding to a library-name. Then, the server 38 will transmit datagram to the IP address of another side, if datagram is received from one side of both the above-mentioned IP addresses. Thereby, even if each communication equipment 32 and 33 does not know a mutual IP address, it can communicate bidirectionally mutually. Like a 1st above-mentioned embodiment, during communication by network meeting software, each communication equipment 32 and 33 does not encipher a communication content, but, according to this embodiment, is reducing the burden at the time of communication. However, using a partner's public key, when the term period concerned also enciphers a communication content, the safety to jamming can be improved further.

[0104]After both the communication equipment 32 and 33 carries out [use] two-way communication of the network meeting software to a 1st embodiment at the approximately said appearance, after S29 a-S 31b, dialup connection is cut with the end of a meeting, and communication ends it.

[0105]In the communications system 31 concerning this embodiment, since the server 38 is relaying communication, when the communication equipment 32 calls the communication equipment 33, a mutual IP address is not needed. Therefore, not both the providers 35 and 36 may be the email servers of each

communication equipment 32 and 33, and the communication equipment 32 and 33 does not send and receive an E-mail. Even in this case, the same effect as this embodiment is acquired.

[0106]Each communication equipment 32 and 33 needs to notify a library-name to the IP address of the server 38 in above-mentioned S28 a-S 30b. This IP address may be beforehand memorized in the Flash memory 11 etc. which are shown in drawing 2, for example, and may arrange during communication by the telephone line 34. If the common server 38 is specified between the communication equipment 32.33 before registration by above-mentioned S28 a-S 30b, the specification method of the server 38 will not be asked.

[0107][A 3rd embodiment] 1st and 2nd embodiments of the above are using Internet networks 7 and 37 as a means of communication different from the direct communication by the telephone lines 4 and 34. On the other hand, this embodiment explains the case where personal computer communications are used, as another means of communication.

[0108]As shown in drawing 7, in the communications system 41 concerning this embodiment, the user of each communication equipment 42 and 43 has joined personal computer communications, he telephones the communication equipment 42 and 43 to the neighboring access points 45 and 46, and it makes dialup connection at the personal-computer-communications server 47.

[0109]The personal-computer-communications server 47 communicates with the communication equipment 42 and 43, for example, provides predetermined services, such as database retrieval. The personal-computer-communications server 47 concerning this embodiment can relay communication between both the communication equipment 42.43 like the server 38 shown in drawing 5. Thereby, it can communicate bidirectionally via the personal-computer-communications server 47 between both the communication equipment 42.43.

[0110]When the member is managed by ID etc. and each communication equipment 42 and 43 connects via the telephone line 44 like the providers 5 and 6 who show drawing 1, the personal-computer-communications server 47 compares ID and a password, and identifies each communication equipment 42 and 43. However, unlike the case where it communicates via Internet network 7, with the communications system 41 shown in drawing 7, each ID of both the communication equipment 42 and 43 is managed by the personal-computer-communications server 47 like the communications system 1 shown in drawing 1. Therefore, in the communications system 41 concerned, a communications partner is specified by each ID. It is mutually connected by the circuits 48 and 48 for exclusive use between each access points 45 and 46 and the personal-computer-communications server 47.

[0111]Now, many above-mentioned personal-computer-communications servers 47 are formed. Therefore, the communications system 41 can be constituted comparatively easily by choosing one of them and forming the communication equipment 42 and 43.

[0112]The communication equipment 42 and 43 concerning this embodiment is hardware constitutions of the approximately said appearance as the communication equipment 2 and 3 (22) shown in a 1st embodiment. However, the communication equipment 42 and 43 concerning this embodiment sends and receives the data of form according to a communication method with the personal-computer-communications server 47 concerned, when connected to the personal-computer-communications server 47. The transmission and reception of the data of the form concerned can realize easily the hardware or software of the communication equipment 2 and 3 only by carrying out a partial change.

[0113]In the above-mentioned composition, when the communication equipment 42 calls the communication equipment 43, the communications system 41 operates, as shown in drawing 8. That is, in S41a thru/or S44a and S41b thru/or S46b, before the communication equipment 42 communicates via the personal-computer-communications server 47, it performs the same processing as drawing 6, calls the communication equipment 43 via the telephone line 44, and tells a connection request. Under the present circumstances, both the communication equipment 42 and 43 exchanges a mutual public key.

[0114]Then, in S45a thru/or S48a and S47b thru/or S50b, like drawing 6, both the communication equipment 42 and 43 makes dialup connection to the personal-computer-communications server 47, and communicates via network meeting software to it, respectively.

[0115]However, in this embodiment, a communications partner is specified using ID peculiar to each communication equipment 42 and 43. Therefore, processing of S27 a-S 29a shown in drawing 6 and S29 b-S 31b is excluded. In this embodiment, in S47a and S49b, when communicating with network meeting software, via the telephone line 44, using the beforehand exchanged partner's public key, both the communication equipment 42 and 43 enciphers, respectively, and sends out a communication content. The enciphered communication content is decoded using its secret key currently held beforehand. Thereby, a communication content can be concealed from a third party.

[0116][A 4th embodiment] Even if it is a time of the communication equipment 2 (32, 42) calling the

communication equipment 3 (33, 43) in the above 1st thru/or a 3rd embodiment, Contrary to this, even if it is a time of the communication equipment 3 (33, 43) calling the communication equipment 2 (32, 42), the composition for which how to call the dialup connection communication equipment concerning this invention is used is explained. However, how to call the dialup connection communication equipment concerning this invention may be used only when one communication equipment calls the communication equipment of another side.

[0117]Below, only when a surveillance camera system (supervision and control system) is made into an example and the key station side calls the child station side, the case where how to call the dialup connection communication equipment concerning this invention is used is explained in detail. As a network, as shown in the 1st thru/or a 3rd embodiment, an Internet network, personal computer communications, etc. can be used, but below, the case where an Internet network is used is made into an example like a 1st embodiment, and it explains.

[0118]That is, the surveillance camera system 51 concerning this embodiment is provided with the following. For example, the key station (communication equipment by the side of call origination) 52 allotted to the head office as it is used for the surveillance of an unmanned parking lot, etc. and was shown in drawing 9.

The child station (dialup connection communication equipment) 53 allotted to each motor pool.

The sending set (child station means of communication) 53a which sends out the image which surveillance camera 53b—acquired to the key station 52 is formed in the child station 53 concerned, and the image which each surveillance camera 53b acquired is sent to the receiving set (key station means of communication) 52a of the key station 52 via the sending set 53a of the child station 53. In the key station 52, the existence of unapproved parking is checked based on the image concerned. Thereby, unmanned parking lots all over the country can be supervised only in the head office 1 or a place. Therefore, it is not necessary to dispatch the talented people for surveillance to each motor pool, and personnel expenses can be reduced. Charge collections are collected by the local contracted employee etc. once per week, for example.

[0119]It is the composition of the approximately said appearance more as the connector 3a which shows drawing 1 the sending set 53a of the above-mentioned child station 53 at details. However, in order to control two or more surveillance cameras 53b, it differs in that it has the interface of the number according to the number of the surveillance cameras 53b. In connection with this, the directions from the key station 52 are recognized, the surveillance camera 53b with which acquisition of the image was directed is chosen, and the function to direct acquisition of an image is given to the surveillance camera 53b concerned. However, since the function concerned is realizable when CPU14 shown in drawing 2 executes a predetermined program for example, the sending set 53a is realizable by the same hardware as the above-mentioned connector 3a.

[0120]Each above-mentioned surveillance camera 53b is arranged on the position which can photo the number plate of the vehicles parked at each parking space of a motor pool. The resolution of the image which can acquire each surveillance camera 53b is set as the grade which can read the character of a number plate. Each surveillance camera 53b and the above-mentioned sending set 53a, For example, like computer 2b shown in drawing 1, and the connector 2a, it is connected by the predetermined correspondence procedure, and the surveillance camera 53b can acquire an image according to directions of the sending set 53a, and it can send out the picture image data in which the acquired image is shown to the sending set 53a.

[0121]In this embodiment, the radiotelephone system is used for a part of telephone line 54, and the sending set 53a is connected with the key station 52 or the provider 56 via the cellular-phone machine 53c. Various systems of a radiotelephone system, such as a Personal Handyphone System (below, PHS is called) and an automobile telephone system, are available, for example, and the cellular-phone machine 53c according to each system is formed in the child station 53. Direct continuation of the sending set 53a and the telephone line 54 may be carried out like the connector 3a shown in drawing 1, without using a radiotelephone system.

[0122]Thereby, like the communication equipment 33 shown in drawing 1, the child station 53 can carry out direct communication with the key station 52 via the telephone line 54, and it makes dialup connection to Internet network 57 via the telephone line 54 ** provider 56.

[0123]On the other hand, the child station 53 and communication are possible for the above-mentioned key station 52 like the communication equipment 2 shown in drawing 1 by the both sides of the direct continuation through the telephone line 54, and connection through Internet network 57. However, the key stations 52 concerning this embodiment differ in the above-mentioned communication equipment 2, and direct continuation is carried out to Internet network 57 by the dedicated line 58. Thereby, using how to call the dialup connection communication equipment concerning this invention, the key station 52 calls the child station 53, and can communicate. Since the key station 52 concerning this embodiment is always connected to Internet network 57 by the dedicated line 58, the peculiar IP address is assigned to the key station 52.

[0124]The key station 52 concerning this embodiment is replaced with the connector 2a shown in drawing 1, the receiving set 52a is formed, replace with computer 2b and the telephone 2c, and the image from the surveillance

camera 53b is reported to a user, and, specifically, the terminal 52b which receives a user's directions is established. Like the above-mentioned connector 2a and computer 2b, LAN etc. are connected by the predetermined correspondence procedure, and data can be sent [the receiving set 52a and the terminal 52b concerned], for example and received bidirectionally.

[0125]The receiving set 52a concerning this embodiment possesses a terminal adopter (TA) function, and via the digital service unit (DSU) which is not illustrated, is constituted so that an ISDN circuit and connection are possible. An ISDN circuit is a single member contract, in order that it may be a digital circuit in which concurrent use is possible and one circuit may connect two circuits (B channel) to the Internet as the dedicated line 58, it is monopolized, and another side is used as the telephone line 54. The dedicated line 58 can use not only this but a cable TV circuit, and various circuits, such as an optical fiber. However, since the both sides of the dedicated line 58 and the telephone line 54 are realizable by a single member contract if an ISDN circuit is used, the key station 52 can be realized comparatively cheaply.

[0126]As shown in drawing 10, although the receiving sets 52a are the connector 2a shown in drawing 2, and similar composition, they are replaced with IC13 for communication, and, specifically, the S/T point interface (it is called for short S/T point I/F) 18 connected to above-mentioned DSU is formed. Based on directions of CPU14, the S/T point I/F18 concerned can control setting out/cutting of a call (a line connection/cutting), or can change mutually the data row which CPU14 processes, and the electrical signal transmitted in an ISDN circuit top. After S/T point I/F18 modulates the data row which CPU14 processes to an audio signal, it can be sent out on an ISDN circuit, can restore to the audio signal sent from the ISDN circuit, and can also change it into the data row which CPU14 processes. Thereby, the receiving set 52a can carry out direct communication via the sending set 53a and the telephone line 54 of the child station 53. V32, V32bis, V34, V21, V22, etc. is the serial communication according to a predetermined standard, and a message can be sent [the correspondence procedure between the receiving set 52a and the sending set 53a] and received among both, for example.

[0127]Thereby, as for the receiving set 52a, the child station 53 calls directly via the telephone line 54, and it can communicate with the child station 53 via the dedicated line 58 and Internet network 57.

[0128]If the function as the key station 52 whole is the same, according to a use, can set [the division of roles of the receiving set 52a and the terminal 52b, and] up freely whether both are formed in one, but. Below, the case where the receiving set 52a works as a server which receives the image from the surveillance camera 53b is made into an example, and it explains. In this case, the image from each surveillance camera 53b is accumulated in the receiving set 52a, and it points to the terminal 52b to the receiving set 52a, it receives these images, and displays the image concerned. When it is judged that a user, on the other hand, wants to acquire the image of the place where a certain surveillance camera 53b is arranged, by keystroke etc., the terminal 52b identifies a user's directions and notifies the receiving set 52a that the acquisition request of the image over the surveillance camera 53b concerned occurred, for example. The receiving set 52a identifies the child station 53 corresponding to the surveillance camera 53b based on the notice from the terminal 52b, and calls the child station 53 concerned using how to call the dialup connection communication equipment concerning this invention.

[0129]Below, operation of the key station 52 at the time of calling the child station 53 and the child station 53 is explained based on the flow chart shown in drawing 11. The step which shows the operation by the side of [52] call origination (i.e., a key station) like the flow chart concerning the above 1st thru/or a 3rd embodiment, For example, a called party, i.e., the step which shows operation of the child station 53, is referred to with the numerals which gave "b" to the end by referring to S61a etc. with the numerals which gave "a" to the end.

[0130]Namely, in the key station 52, the terminal 52b generates the request to receipt which shows that he would like to acquire the image from the surveillance camera 53b, for example according to a user's directions etc., and notifies it to the receiving set 52a (S61a). The receiving set 52a acquires the information for searching the child station 53 corresponding to the surveillance camera 53b concerned, for example, calling the child stations 53 concerned, such as a telephone number and a password, based on the request to receipt concerned. Using the circuit which has **ed of the two ISDN circuits, the receiving set 52a telephones the above-mentioned telephone number, and carries out the telephone call of the sending set 53a of the child station 53 (S62a). If the sending set 53a answers a telephone call (S61b), the direct communication through the telephone line 54 will become possible between the receiving set 52a and the sending set 53a.

[0131]When the receiving set 52a notifies the password beforehand provided in the sending set 53a in S63a, in S62b the sending set 53a, The received password attests whether it is the regular password defined beforehand, and, in the case of a regular password, sends out a response message to the receiving set 52a.

[0132]When a response message is received, the receiving set 52a, The communications parameter (access information) used when connecting via Internet network 57 in S64a is connected to the sending set 53a, and the sending set 53a cuts a line connection with the telephone line 54, after receiving the communications parameter

concerned (S63b). Thereby, the direct continuation between the receiving set 52a and the sending set 53a is cut.

[0133]The communications parameter sent out by the above S64a includes the telephone number of the nearby provider 56 of the sending set 53a, and the dialup information used for a row when the sending sets 53a, such as the provider's 56 account, a password, etc., make dialup connection, for example. The receiving set 52a may notify the dialup information beforehand matched with each sending set 53a, and, For example, using the service etc. for which a radio communications system notifies both sides with a called party of the current position of a terminal the call origination side, the receiving set 52a may check the position of the sending set 53a, and may notify the dialup information according to the sending set 53a.

[0134]To the above-mentioned communications parameter, for example An encryption key and the IP address of the receiving set 52a, The information used when transmitting picture image data is included via the login name for ftp (File Transfer Protocol), the conditions of a communication start, etc. and Internet networks 57. More, the above-mentioned encryption key is an encryption key used when the sending set 53a enciphers picture image data, and the thing of different throwing away for every connection is used for details. The conditions which the conditions of a communication start show the conditions at the time of the sending set 53a connecting with the receiving set 52a via Internet network 57 via Internet network 57, and are shown below are mentioned. When the 1st condition is chosen, after the receiving set 52a calls the sending set 53a by the telephone line 54 and direct communication is cut, the child station 53 starts communication immediately. When the 2nd condition is chosen, the sending set 53a starts communication automatically in a fixed time interval or specified time. If the 3rd condition is chosen, the sending set 53a will start communication automatically, when something is concerned in abnormalities by the sensor (not shown) connected to the sending set 53a. In addition, if the 4th condition is chosen, the sending set 53a will start communication automatically, when image processing of the image from each surveillance camera 53b is always carried out and a predetermined change appears in an image. If the 5th condition is chosen, the sending set 53a will start communication automatically, after connection with the telephone concerned is cut, when a call is received from the usual telephone (not shown) which is not illustrated via the telephone line 54.

[0135]If the direct communication between the receiving set 52a and the sending set 53a is cut by the above S63b, the sending set 53a will stand by until the start condition of the communication notified by the above S64a is fulfilled (S64b).

[0136]When a communication condition is fulfilled, point to the sending set 53a, for example so that a photograph may be taken to the surveillance camera 53b, or, Or the latest image is chosen among the images currently sent from the surveillance camera 53b, the picture image data from the surveillance camera 53b is acquired, and it enciphers using the encryption key notified by the above S64a. The sending set 53a makes dialup connection to Internet network 57 via the provider 56 directed by the above S64a (S65b). Thereby, an IP address is assigned and the sending set 53a is connected to Internet network 57. The receiving set 52a is always connected to Internet network 57 via the dedicated line 58.

[0137]Then, the sending set 53a requires ftp connection of the receiving set 52a via Internet network 57 in S66b (S66b). A ftp connection request sends out a predetermined command to the IP address of the receiving set 52a notified by the above S64a, for example, and is required.

[0138]The receiving set 52a will transmit a random number to the sending set 53a in a login name input screen, if a ftp connection request is received (S65a). Since it has not opted for it until the IP address of the sending set 53a is assigned by the above S65b, the receiving set 52a cannot predict the IP address of the sending set 53a beforehand. However, the IP address of the sending set 53a is included in the datagram sent out to the receiving set 52a when the sending set 53a required ftp connection by the above S66b as an IP address of a transmitting agency. Therefore, the receiving set 52a can transmit arbitrary data to the sending set 53a via Internet network 57 convenient at all by transmitting datagram to the IP address concerned.

[0139]The sending set 53a enciphers the received random number using the encryption key notified by the above S64a, generates a password, and sends out the password concerned to the receiving set 52a (S67b). On the other hand, the receiving set 52a judges whether the received password is a password enciphered using the password which corresponded to the login name and was notified by the above S64a. And when it is the password correctly enciphered corresponding to the login name, it recognizes that the sending set 53a is a regular partner (S66a).

[0140]The recognized sending set 53a transmits the picture image data enciphered by the above S65b to the receiving set 52a with a ftp protocol (S68b). The picture image data concerned reaches to the receiving set 52a via Internet network 57, and the receiving set 52a receives the enciphered picture image data (S67a). If transmission is completed, the sending set 53a will cut a line connection with the provider 56 (S69b). This completes the communication which went via Internet network 57 between the receiving set 52a and the sending

set 53a.

[0141]The receiving set 52a telephones the sending set 53a, and it is checked whether the line connection between the sending set 53a and the provider 56 is cut normally based on a ring tone (S68a). When a telephone call is received, specifically, the sending set 53a is set up, for example not carry out receipt until the ring tone of the predetermined number of times becomes one to twice etc. As a result, when the receiving set 52a telephones the sending set 53a, the ring tone of a predetermined number time is sounded. In the usual telephone line 54, ring tones differ by whether the sending set 53a used as a called party is carrying out the line connection. Therefore, the receiving set 52a can check whether the line connection of the sending set 53a and the provider 56 is cut with a ring tone.

[0142]For example, when the usual ring tone which shows that it is not during the conversation sounds, the receiving set 52a judges that the sending set 53a has cut connection with Internet network 57 correctly. On the other hand, when the sound of the two two which shows during the conversation sounds, it is judged that the sending set 53a connects the receiving set 52a to Internet network 57. In this case, the receiving set 52a sends out a cutting command to the IP address of the sending set 53a which was communicating to previously by Internet network 57 course, and can direct line disconnection to the sending set 53a, for example. In response to the notice of the receiving set 52a, the user of the terminal 52b may go to the setting position of the surveillance camera 53b, and may cut a line connection.

[0143]Even if it is which case, the key station 52 side can grasp failure in the line disconnection in the child station 53, and can devise suitable treatment. As a result, generating of the useless communication cost resulting from failure in line disconnection can be prevented certainly. Phonecall charges will be no charge if the receiving set 52a stops a telephone call by the predetermined number of times of the above.

[0144]In S69a, the receiving set 52a decodes the received picture image data, and sends out the decoded picture image data to other apparatus, such as the terminal 52b shown in drawing 9, with a ftp protocol. Thereby, picture image data is displayed on the terminal 52b, and the user of the terminal 52b can check the image of the setting position of the surveillance camera 53b.

[0145]As a result, at the arbitrary times, even if it is a case where dialup connection of the child station 53 is made, when the key station 52 can check the image from the surveillance camera 53b, and unapproved parking is discovered and there are a certain abnormalities, for example, it can supervise the specific surveillance camera 53b preponderantly. Therefore, the processing to which it responded unusually, such as enclosing with a fence etc. the parking space by which unapproved parking is carried out, or connecting it to a security company, can be devised.

[0146]By the way, as mentioned above, the communication equipment which constitutes Internet network 57 has received datagram from neighboring communication equipment irrespective of the IP address of the communication equipment of a transmitting agency. Therefore, if the receiving set 52a is within the limits of the throughput of the receiving set 52a, and the channel capacity of the dedicated line 58, it can receive the picture image data from two or more sending sets 53a by Internet network 57 course. The receiving set 52a can maintain simultaneously connection of Internet network 57 course, and the direct continuation through the telephone line 54. Therefore, even if the receiving set 52a is while having received picture image data by the Internet network 57 course, it carries out the telephone call of other sending sets 53a, and can direct acquisition of an image.

[0147]Each above-mentioned step explains the case where the image which the surveillance camera 53b acquired is sent out to the receiving set 52a by Internet network 57 course. However, for example, when the provider 56 is crowded and the data communications of Internet network 57 course are difficult, the sending set 53a can carry out the telephone call of the receiving set 52a, and can also transmit an image by the direct communication through the telephone line 54. In this case, since access or encryption to Internet network 57 are not needed, the sending set 53a can transmit an image to the receiving set 52a, when quicker.

[0148]In each above-mentioned step, although the receiving set 52a and the sending set 53a are transmitting picture image data using a ftp protocol, they are not restricted to this. If it is the method that data can be transmitted by Internet network 57 course, an E-mail etc. can transmit picture image data using other methods, for example. However, in a ftp protocol, it can be certainly checked on the both sides of the receiving set 52a and the sending set 53a whether data has been transmitted or not. Therefore, it can lecture on suitable treatment, such as resending data, when data communications go wrong.

[0149]In the above S68a, although the receiving set 52a is checking whether the line connection of the sending set 53a is cut with the ring tone, it is not restricted to this. For example, when the receiving set 52a carries out the telephone call of the sending set 53a and carries out direct communication, it may be checked whether the line connection is cut. However, since communication cost does not start when cutting of a line connection is checked with a ring tone, compared with the case where direct communication is carried out, communication

cost is further reducible.

[0150]Here, an example of the expense at the time of managing the above-mentioned surveillance camera system 51 is explained briefly. In the above-mentioned surveillance camera system 51, since a number plate is checked based on the image acquired from the surveillance camera 53b, for example, it is after compression and about 500 K bytes per sheet of highly precise image is required. Therefore, when carrying out the direct communication of the image concerned using the ISDN circuit whose access speed of data is 64k bps, it needs for transmission of the image of one sheet about 62 second. Here, when the key station 52 and the child station 53 are allotted to Tokyo and Nagoya, communication cost changes to about 40 yen. As a result, when the acquisition frequency of an image is made into about 1 time in 1 hour, about 350,400 yen is needed in one year. If the expense in the case of carrying out direct communication on the same conditions in the analog network whose access speed is 33.6k bps is computed, since it is required for one transmission in about 120 seconds, communication cost is about 120 yen per time, and one year, and about 700,800 yen is needed. When the child station 53 connects with Internet network 57 in a dedicated line, these days, the dedicated line fee of about 400,000 yen per year is needed.

[0151]On the other hand, if it is Internet network 7 course and there is BUROBAIDA 6 within limits which can talk over the telephone by the child station 53 and a local call rate, since the time which one transmission takes will be less than 180 seconds, the communication cost per time changes to 10 yen, is one year and changes to about 87,600 yen. If the provider's 6 utilization charge is made into about 60,000 yen per year, the communication cost per year will change to about 147,600 yen. As a result, in the above-mentioned surveillance camera system 51, even if it compares the communication cost of about 560,000 yen (about 79%) per child station 53 with the case of ISDN compared with the case where direct communication is carried out in a normal line, it is substantially reducible with an about 200,000 yen (about 57%) grade. The accuracy of the image needed in the key station 52, number of sheets, or communication frequency follows on increasing, and becomes relatively cheaper [the communication cost of the surveillance camera system 51]. As compared with the case where the child station 53 carries out leased line connection, the communication cost per child station 53 can carry out about 250,000 yen (about 63%) grade reduction in every year in the above-mentioned surveillance camera system 51.

[0152]Above-mentioned communication cost is an example to the last, and changes greatly with the tariff structure of the communication line to be used, the provider's 6 tariff structure, etc. However, as mentioned above, network tends to reduce communication cost from the field of the equipment etc. which communication takes than a communication line. Even when communicating in a network, dialup connection tends to reduce communication cost than connection by a dedicated line. Therefore, even if it compares with any in case the key station 52 and the child station 53 carry out direct communication when the child station 53 carries out leased line connection of the communication cost of the above-mentioned surveillance camera system 51 and, there are many substantially cheap things.

[0153][A 5th embodiment] A 4th embodiment of the above explains the case where the key station 52 is always connected to Internet network 57 by the dedicated line 58. On the other hand, as shown in drawing 12, this embodiment explains the case where the key station 52 makes dialup connection to Internet network 57 via the provider 55 like the communication equipment 2 shown in drawing 1.

[0154]The receiving sets 52a concerning this embodiment are the same hardware constitutions as a 4th embodiment, and when they communicate with the child station 53, they make dialup connection to the provider 55 using one side of the two ISDN circuits. The child station 53 of the residual composition of the surveillance camera system 51, etc. are the same as that of the composition of a 4th embodiment. Therefore, the same reference number is given to the member which has the same function as a 4th embodiment, explanation is omitted, and, below, operation of the key station 52 and the child station 53 is explained in detail based on the flow chart shown in drawing 13.

[0155]That is, in addition to each step shown in drawing 11, in this embodiment, both the steps of S71a and S72a are provided. In S71a provided after S61a, the receiving set 52a makes dialup connection via the provider 55 at Internet network 57, when not connected with Internet network 57. Thereby, the receiving set 52a can obtain its IP address notified in continuing S64a.

[0156]The receiving set 52a is connected to the ISDN circuit. Therefore, in above-mentioned S62a, the receiving set 52a can call the sending set 53a using the circuit of another side, maintaining connection with Internet network 57 by one circuit. As a result, as for S64b or subsequent ones, the IP address assigned to the receiving set 52a by the above S71a is assigned to the receiving set 52a.

[0157]On the other hand, in S72a provided after S67a, the receiving set 52a cuts a line connection with the provider 55. Thereby, the receiving set 52a is separated from Internet network 57.

[0158]In the above-mentioned composition, the receiving set 52a is making dialup connection to Internet

network 57. Therefore, the receiving set 52a can reduce communication cost further compared with a 4th embodiment connected by the dedicated line 58.

- [0159] If the receiving set 52a chooses the 2nd thru/or the 5th condition that a communication start time is not manageable, in the above-mentioned composition among the communication start conditions notified in above-mentioned S64a, When the sending set 53a tends to transmit an image, the receiving set 52a may not be connected to Internet network 57. Therefore, when choosing these conditions, the sending set 53a needs to call the receiving set 52a using how to call the dialup connection communication equipment concerning this invention. In this case, as shown in the 1st thru/or a 2nd embodiment, an E-mail is used for the receiving set 52a and the sending set 53a, or they notify it against their IP address via a server.

[0160] By the way, although the case where pointed to photography to the surveillance camera of an unmanned parking lot, and the photoed image was acquired as an example of application of a surveillance camera system was made into the example and explained by 4th and 5th embodiments of the above, the surveillance camera system concerning this invention can be used not only for this but for various uses. For example, if a surveillance camera is arranged in the building and warehouse which are held in here and there [national], the commissioned company can supervise a building and a warehouse from one administration building used as a key station. Similarly, the unmanned store and the uninhabited convenience store of a drive-in are applicable also to the use supervised from the head office. It can be used, also when a financial institution manages an unmanned store or an electric power company manages an unattended substation, a dam, etc. of a remote place from the head office. Since the state of a place of delivery can be known in an apparatus maker's head office if a surveillance camera is arranged on the place of delivery of a device, it can profit, when carrying out remote maintenance of the supplied device. Or if unmanned cameras are arranged to the volcano of every place, these volcanic activity can also be supervised from the research institute of a university. Various market information, such as box office for every time zone, the number of visitors, composition, an age group, or a place that sits down, is collectable in the head office by arranging a surveillance camera on a fast food, a restaurant, a chain of convenience stores, etc., and transmitting the data which photoed each inside of a store to the head office.

[0161] Since it is not necessary to dispatch the talented people for supervising even if it is which case, personnel expenses are reducible. In addition, since the supervised data is transmitted via networks, such as the Internet, it can reduce communication cost substantially compared with the case where communication lines, such as a telephone line, are used. Since a surveillance camera is called in a communication line, the key station can direct acquisition of an image in a surveillance camera at the time of a request. The surveillance camera system which can acquire the image at the arbitrary times is [these results] realizable on few budgets.

[0162] Although the case where the controlled object of the child station 53 is the surveillance camera 53b is made into an example and explained by 4th and 5th embodiments of the above, it does not restrict to this. For example, when the child station 53 sends out the data acquired using the various sensor etc. to the key station 52, or when the child station 53 controls a motor, a pump, etc. based on directions of the key station 52, this invention can be applied to the supervision and control system which makes various apparatus a controlled object. However, since the time which communication takes is long when there is much data volume transmitted like [in the case of transmitting the image which the surveillance camera 53b acquired], if the data concerned is sent out in the direct communication by a communication line, communication cost will soar. Therefore, the effect at the time of applying this invention to the surveillance camera system 51 becomes large especially.

[0163] As shown in each above 1st thru/or 5th embodiment, how to call dialup connection communication equipment, The communication equipment of the call origination side and the called party is connected to the telephone line, respectively, and. The communication equipment of a called party is the method of calling applied to networks, such as an Internet network and personal computer communications, via the telephone line concerned at the communications system by which dialup connection is made at least, Before communicating via a network, it is characterized by using a telephone line and the communication equipment by the side of call origination telling a connection request to the communication equipment of a called party.

[0164] Even if it is a case where the communication equipment of the called party is not connected to the network, by this, when communicating via a network, the communication equipment of a called party can be connected to a network. Therefore, both communication equipment can start communication certainly in desired timing. Thereby, compared with the former, the readiness of the communication equipment of a called party can be improved and real time communication becomes possible.

[0165] The communication equipment of the called party at least is connected to the network by dialup connection. Therefore, the expense at the time of communicating via a network can be substantially reduced compared with the case where it connects with a network via a dedicated line, and the case where direct communication is carried out via a telephone line. Since especially the expense in the case of carrying out direct communication via a telephone line when places in which both communication equipment is installed, such as

overseas, are separated is very high, its effect is large.

[0166]Although each above-mentioned embodiment explained the case where both communication equipment made dialup connection, respectively, it does not restrict to this. For example, if the communication equipment of a called party is a communications system which makes dialup connection at least as shown in a 4th embodiment, the same effect as each 1st thru/or 5th embodiment will be acquired.

[0167]In each above-mentioned embodiment, although the communication equipment by the side of call origination has notified the connection request using a telephone line, it does not restrict to this. For example, other communication lines, such as marine vessel radio, may be used. If a connection request can be notified to a called party, the same effect as each embodiment will be acquired.

[0168]Although each above-mentioned embodiment explains the case where the communication equipment by the side of call origination calls one set of communication equipment, not only this but two or more communication equipment may be called. Much communication equipment can communicate simultaneously on a network like the case where one set of communication equipment is called, by calling two or more communication equipment by a telephone line in order. In this case, the user of the communication equipment by the side of call origination turns into a call person of a meeting. Although two or more communication equipment is [the network meeting software which can communicate] simultaneously needed in this case, such a product is already used generally.

[0169]By the way, the communication equipment concerning each above-mentioned embodiment is not restricted to this, although a user name, a communication content, etc. have enciphered at least some data transmitted in a network. When communicating in a network, a code in particular may not be given but data may be sent out with a plaintext.

[0170]However, when it sends out data with a plaintext, the data transmitted in a network has a possibility that it may be intercepted or altered. In particular, as a network, when using an Internet network etc., communication equipment of an origination side and a receiver cannot specify the transmission line of data. Therefore, tapping etc. are easy and the danger of blocking communication is high.

[0171]On the other hand, in each above-mentioned embodiment, when transmitting data in a network, at least some data is enciphered with various encryption keys, such as a partner's public key, a common encryption key, etc., for example. Thereby, from the third party who is not a regular communications partner, since at least some data can be concealed, the safety to jamming can be improved.

[0172]As for the data to encipher, a user name or an address of the communication content itself and both communication equipment, etc. is mentioned, for example. However, since the burden of both communication equipment increases as the data volume to encipher increases, only some data may be enciphered in consideration of communicative importance. Generally, a third party's speculation of a user name, an address, etc. will be easy to guess the importance of a communication content. Therefore, as shown in 1st and 2nd embodiments, when transmitting a user name, an address, etc. in advance of communication of a picture, a sound, etc., especially a thing for which these are enciphered is desired. Thereby, the safety to jamming can be improved, without making the burden of both communication equipment increase not much.

[0173]The way each communication equipment acquires an encryption key can consider various methods. For example, mailing etc. may be stored in the memory measure of each communication equipment, such as the Flash memory 11 of which a partner is notified beforehand for example, which is shown in drawing 2 by other means of communication. However, the user of each communication equipment needs to set the encryption key notified by the partner to each communication equipment in advance of communication in this case. The time and effort at the time of setting out also increases as a communications partner increases, since an encryption key is prepared for every communication equipment. An encryption key must be changed if needed, in order to raise the safety to jamming. Therefore, whenever the user of each communication equipment changes his encryption key, he needs to notify a new encryption key to all the communications partners.

[0174]On the other hand, at each above-mentioned embodiment, the encryption key is notified in the communication line at the time of a connection request. When the encryption key comprises a public key and a secret key, a public key mutual at a communication line is exchanged. When using a common encryption key, one communication equipment should just notify to another side. Since an encryption key is notified for every connection request in this composition, correction is easy even if it is a case where the time of communicating last time and an encryption key are changed. Therefore, an encryption key can be easily changed for every connection request, and the safety to jamming can be improved further. In addition, it is carrying out using the telephone line by putting in block the both sides of the notice of a connection request, and sending of an encryption key. Therefore, compared with the case where both are performed individually, the time and effort which connects a telephone line is reducible.

[0175]It is transmitted by a mutually different means of communication from the data enciphered as the

encryption key. Therefore, when a third party tries disturbance of communication, it is necessary to monitor both communications and the safety to jamming can be improved compared with the case where an encryption key and data are transmitted in a single means of communication. To use communication lines which are comparatively hard to monitor, such as a telephone line, as a communication line, in order to prevent tapping of an encryption key is desired.

[0176]By the way, in addition to the above-mentioned composition, as shown in a 2nd embodiment, when both communication equipment communicates via the server provided in the network, both communication equipment registers a library-name into a server, and both communication equipment needs to notify a partner's library-name to a server, and needs to choose a communications partner.

[0177]In this case, since the library-name registered into the server is exhibited, when a user name is registered as it is, there is a possibility of reducing the safety to jamming. When choosing a desired library-name among the library-names registered into the server, it takes time and effort. In this case, what is necessary is to encipher a user name using the above-mentioned public key, and just to register with a server. Thereby, a user name can be concealed from a third party.

[0178]By the way, as shown in a 2nd embodiment, in the composition which provides a server, expense, a sustaining cost, etc. which provide a server independently are needed. When the server is [each other] crowded, there is a possibility that it may become impossible to communicate among both communication equipment.

[0179]On the other hand, unlike a 2nd embodiment of the above, in a 1st embodiment, the method of carrying out the direct communication of both the communication equipment via a network mutually is provided. When dialup connection is made, the communication equipment of a called party acquires its address, and, specifically, the process of transmitting to the communication equipment by the side of call origination by E-mail is established. Thereby, both communication equipment can communicate via a network, without providing especially a server unlike a 2nd embodiment. As a result, the expense which communication takes is further reducible. It is not concerned with confusion of a server but both communication equipment can communicate certainly.

[0180]By the way, after communication through a network is completed, dialup connection communication equipment cuts connection with a network. Here, since the dialup connection communication equipment concerned will continue being connected to a network if dialup connection communication equipment fails in line disconnection with a network, communication cost soars undesirably. When dialup connection communication equipment is a child station of a supervision and control system and a user is not in the circumference of dialup connection communication equipment in particular, for example, it is hard to grasp that line disconnection went wrong. Therefore, when line disconnection goes wrong, the period when the dialup connection communication equipment concerned is undesirably connected to a network tends to become long, and a possibility that useless communication cost may increase is large.

[0181]On the other hand, as shown in 4th and 5th embodiments, after the communication via a network is completed, via a communication line, the communication equipment by the side of the above-mentioned call origination calls dialup connection communication equipment, and is checking that the dialup connection has been cut normally. As a result, the useless communication cost resulting from failure in line disconnection is reducible.

[0182]By the way, how to call the dialup connection communication equipment concerning this invention as an example of the communications system to apply in the above 1st thru/or a 3rd embodiment. Although the Internet telephone system which transmits an image, a sound, etc. is explained and 4th and 5th embodiments explain supervision and control systems, such as a surveillance camera system, it does not restrict to this. When building Internet VPN (Virtual Private Network) and sending and receiving arbitrary data, it can apply widely.

[0183]However, a communicative start is possible to desired timing by using how to call the dialup connection communication equipment concerned, And since the communications system which can reduce communication cost can be built, it is especially suitable when readiness is strongly required like an Internet telephone system or a supervision and control system for example.

[0184]With a supervision and control system, generally the child station is installed in the place distant from the key station, and, specifically, a key station carries out supervisor control of many child stations. Therefore, the expense at the time of a key station and a child station communicating tends to increase, and reduction of communication cost is demanded strongly. On the other hand, in a supervision and control system, since the delay in directions links with expansion of an accident directly, the child station must answer directions of a key station immediately. Therefore, when a child station communicates with a key station only via the network connected by dialup connection, a child station cannot conform to directions of a key station, but there is a possibility of making an accident expanding. Reducing communication cost is called for strongly, these results'

maintaining the readiness of the child station to directions of a key station in a supervision and control system. Therefore, it is especially effective, when a key station calls a child station and how to call the dialup connection communication equipment concerning this invention is applied.

[0185]

[Effect of the Invention]How to call the communication dialup connection communication equipment concerning the invention of claim 1, As mentioned above, it is provided apart from a network and by the communication line which can call the above-mentioned dialup connection communication equipment. The 1st process which the communication equipment by the side of call origination reports that a connection request is to dialup connection communication equipment, It is the composition that the dialup connection communication equipment which received the connection request includes the 2nd process of making dialup connection to the above-mentioned network, and the 3rd process with which the communication equipment and dialup connection communication equipment by the side of call origination communicate via the above-mentioned network.

[0186]In the above-mentioned composition, even if it is a case where dialup connection communication equipment is not connected to the network, at the time of the communication in the 3rd process of the above, the dialup connection communication equipment concerned can be connected to a network. So, in the dialup connection communication equipment which can communicate at a cheap fee, communication can be certainly started in desired timing and the effect that it can communicate in real time is done.

[0187]How to call the dialup connection communication equipment concerning the invention of claim 2, As mentioned above, in the composition of the invention according to claim 1 the 3rd process of the above, It is the composition include the code process to which the communication equipment of the transmitting side enciphers and sends out at least some data sent out at the 3rd process concerned among the communication equipment by the side of the above-mentioned call origination, and dialup connection communication equipment, and the decoding process at which the communication equipment of a receiver decodes the enciphered data.

[0188]In the above-mentioned composition, at least the part is concealed by encryption among communication contents from third parties other than the communication equipment by the side of call origination, and dialup connection communication equipment. As a result, a communication content is not enciphered but the effect that the safety to jamming can be improved is done so compared with the case where it transmits with a plaintext.

[0189]How to call the dialup connection communication equipment concerning the invention of claim 3 is the composition that the 1st process of the above includes the process which the communication equipment or dialup connection communication equipment by the side of call origination notifies against the encryption key used in the case of encryption, in the composition of the invention according to claim 2.

[0190]In the above-mentioned composition, it is carrying out by putting in block the both sides of the notice of a connection request, and sending of an encryption key. Without making by this the time and effort which a communication line connects increase, an encryption key can be transmitted for every connection and the effect that the time and effort at the time of changing an encryption key is reducible is done so.

[0191]It is transmitted by a mutually different means of communication from the data enciphered as the encryption key. As a result, tapping, the alteration of data, etc. do so collectively the effect that the safety to jamming can be improved further.

[0192]How to call the dialup connection communication equipment concerning the invention of claim 4, As mentioned above, in the composition of the invention according to claim 1, 2, or 3 the 3rd process of the above, It is the composition include the process which both the above-mentioned communication equipment notifies, respectively that the library-name which shows oneself is to the server which relays communication, the process as which both the above-mentioned communication equipment notifies a partner's library-name to the above-mentioned server, and chooses a partner's communication equipment, and the process of relaying communication between the communication equipment in which the above-mentioned server was chosen.

[0193]So, via the server provided in the network, both communication equipment can start communication certainly in desired timing, and does the effect that it can communicate in real time.

[0194]How to call the dialup connection communication equipment concerning the invention of claim 5, As mentioned above, in the composition of the invention according to claim 1, 2, or 3 the 3rd process of the above, Dialup connection communication equipment with the process of acquiring one's address in the present connection, and an E-mail. It is the composition that dialup connection communication equipment includes the process of notifying one's address to the communication equipment by the side of call origination, and the process with which the communication equipment and dialup connection communication equipment by the side of call origination specify a partner with a mutual address, and communicate.

[0195]So, both communication equipment can communicate via a network like the composition of claim 4, without providing especially a server. As a result, in addition to the effect of the invention according to claim 4,

the expense which communication takes is further reducible, and it is not concerned with confusion of a server but the effect that it can communicate certainly is done so.

▲ [0196]How to call the dialup connection communication equipment concerning the invention of claim 6, As mentioned above, in the composition of the invention according to claim 1, 2, 3, 4, or 5, further after the 3rd process of the above, It is the composition include the 4th process of checking whether the communication equipment by the side of the above-mentioned call origination having called dialup connection communication equipment directly in the above-mentioned communication line, and the dialup connection communication equipment concerned having cut the line connection with the communication line concerned normally.

[0197]So, the communication equipment by the side of call origination can recognize certainly line disconnection failure of dialup connection communication equipment, and does the effect that generating of the useless communication cost resulting from failure in line disconnection can be prevented certainly.

[0198]The supervision and control system concerning the invention of claim 7 as mentioned above a key station, After calling the above-mentioned child station via the communication line which can be called and telling a connection request, Have a key station means of communication which communicates with the above-mentioned child station via the network formed apart from the above-mentioned communication line, and the above-mentioned child station, After receiving the above-mentioned connection request via the above-mentioned communication line, it is the composition which made dialup connection at the above-mentioned network, and is provided with the child station means of communication concerned which communicates with the above-mentioned key station via a network.

[0199]After calling a child station using the communication line which a key station means of communication can call, it connects with a network by the dialup connection which can communicate cheaply, and data is sent [a child station means of communication] in the above-mentioned composition and received via the network concerned. As a result, while a child station can conform to directions of a key station, the effect that a substantially reducible supervision and control system is [the communication cost between a child station and a key station] realizable is done so.

[Translation done.]